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COCAINE IN BLOOD OF COCA CHEWERS

B. HOLMSTEDT*, J.-E. LINDGREN*, L. RIVIER**,
AND T. PLOWMAN***

Although the non-medical use of cocaine, either by sniffing or injection, is considered harmful by many medical authorities, there still is controversy as to whether the chewing of coca leaves, as practised by South American Indians, is detrimental or not. Experimental evidence on coca chewing gathered scientifically in the field has not previously been substantiated by measurements of blood levels of cocaine.

During Phase VII of the Alpha-Helix Amazon Expedition 1976-1977, we had occasion to study two methods of administration of coca leaves and to determine the amount of cocaine in blood versus time by an unequivocal method of analysis. Whole coca leaves (*Erythroxylum Coca* Lam.) were obtained from Pisac, Department of Cuzco, Peru. Coca powder (pulverized leaves of *E. Coca* mixed with *Cecropia* leaf ash) was prepared by Witoto Indians of the Río Ampiyacu, Department of Loreto, Peru, according to the custom of the region.

Coca leaves and powder (5-10 g.) were taken orally by human subjects in the same way that South American natives do. The cocaine, as measured by mass fragmentography, persisted in the plasma for more than seven hours and reached concentrations from 10 to 150 ng/ml at 0.38 to 1.95 hours. Half-lives of the elimination of cocaine have been calculated ranging from 1.0 to 1.9 hours. The absorption half-lives ranged from 0.2 to 0.6 hours (see Table 1).

The stimulating effect obtained seems to be well correlated

*Department of Toxicology, Swedish Medical Research Council, Karolinska Institutet, S-104 01, Stockholm, Sweden.

**Institute of Plant Biology and Physiology, University of Lausanne, CH-1005 Lausanne, Switzerland.

***Atkins Research Fellow in Economic Botany, Botanical Museum of Harvard University.

TABLE I

Pharmacokinetic Data on Coca-Chewing

Subject	Amount of plant material (g)	Amount of cocaine (mg)	k_a (h^{-1})	$t_{1/2}$ (h)	C_{max} (ng/ml)	t_p (h)	k_{el} (h^{-1})	t'_{12} (h)
BH	(powder) n.d.	n.d.	4.42	0.16	24	0.38	0.40	1.72
OT	(powder) 10	24	1.19	0.58	59	1.45	0.43	1.62
JEL	(powder) 7	16.8	1.18	0.59	11	1.00	0.58	1.19
TP	(powder) 20	48	1.14	0.61	139	1.03	0.73	0.95
OT	(leaves) 4.4	21	1.15	0.60	149	1.05	0.60	1.22
TP	(leaves) 6.4	30.7	1.68	0.41	78	1.95	0.37	1.86

k_a : Absorption rate constant

k_{el} : Elimination rate constant

$t_{1/2}$: Absorption half-life

$t'_{1/2}$: Elimination half-life

C_{max} : Maximum cocaine concentration in the plasma

t_p : Time at which maximum concentration of cocaine occurred in the plasma

n.d. : Not determined

with the rising concentrations of cocaine in the blood. The shape of the curves fits with the subjective effects reported. The differences in stimulation between using whole coca leaves or coca powder and taking cocaine by local application in the nose or by intravenous injections seems to be essentially a difference in means of administration and dosage. There is, consequently, no reason to believe that the stimulating effect achieved by the use of either coca leaves or powder is not due to cocaine.

An extended report on this experimental project, of which the present article is an abstract, will be published in the *Journal of Ethnopharmacology*.

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